

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Consideration of Comments Summary

Project 2010-03 Modeling Data (MOD B)
Standard Drafting Team

October 7, 2013

RELIABILITY | ACCOUNTABILITY



3353 Peachtree Road N
Suite 600, North Tower
Atlanta, GA 30326

Introduction.....	3
Consideration of Comments.....	4
Process.....	4
Standard Authorization Request (SAR).....	4
Consolidation, Simplification, and Supplemental Information.....	4
Applicability	5
Coordination with Other Standards.....	5
MOD-032-1	6
Short Circuit Data	6
Regional Reliability Organizations (RRO) Applicability.....	6
Registration Concerns	7
Facilities.....	7
Requirement R1	7
Requirement R2	8
Requirement R3	9
Requirement R4	9
Requirement R5	10
MOD-032-1, Attachment 1	11
Attachment 1 – Specific Change Requests.....	11
Short circuit Data	11
Dynamics Models	12
PC/TP Data Requirements and Reporting Procedures.....	13
Miscellaneous.....	13
Black Box Models and Confidentiality Concerns	13
MOD-033-1	16
Implementation Plan	19
VSLs	19

Introduction

The 2010-03 Modeling Data Standard Drafting Team (SDT) thanks all participants for their feedback in finding ways to improve the proposed MOD-032-1 and MOD-033-1 Reliability Standards (MOD B standards). In response to the first formal posting of the standards, the SDT received input that was focused on several issues that assisted the SDT in refining the standards to the set of standards now posted for comment and ballot. The SDT carefully considered all comments in determining whether to make particular changes to the standards, and this document is intended to provide a summary explanation of the SDT's deliberations.

The standards were posted for a 45-day public comment period from August 26, 2013, through September 4, 2013. NERC asked Stakeholders to provide feedback on the standard and associated documents through a special electronic comment form. There were 72 sets of comments, including comments from approximately 201 different people from approximately 91 companies representing all 10 Industry Segments.

Furthermore, the SDT thanks the industry for their continued support and collaboration in discussing the improvements to the existing MOD-010 through MOD-015 standards. The drafts now posted reflect significant discussion and consideration of different viewpoints, and they also reflect an approach to fulfill the industry's obligation to respond to remaining regulatory directives related to MOD-010 through MOD-015.

During the posting of the first draft of the proposed MOD-32-1 and MOD-033-1 Reliability Standards, the drafting team asked questions related to the project's Standard Authorization Request (SAR) and about the approach in each of the standards. As a whole, the SDT found that the responses were thoughtful, organized, and focused.

All comments submitted may be reviewed in their original format on the standard's [project page](#).

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, you can contact Vice President and Director of Standards Mark Lauby at 404-446-2560 or at mark.lauby@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.¹

¹ The appeals process is in the Standard Processes Manual: http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf

Consideration of Comments

Process

During the initial posting for comment and ballot, some commenters disagreed with the approach to post the SAR simultaneously with the MOD B standards. The SDT appreciates these concerns, and notes that this is an issue that is being addressed with collaboration among NERC staff and the NERC Standards Committee. Specific items related to posting were discussed at the September 19, 2013, Standards Committee meeting in Denver, CO. The SDT understands that coordination is occurring with respect to the posting schedule, and it appreciates participants' understanding of this issue as we move forward to find consensus on the specific substance of the standards.

Standard Authorization Request (SAR)

Commenters also provided input into the scope of the SAR, to include suggestions for specific changes in certain places. The SDT did not make changes to the SAR, as they do not change materially the substance of the SAR's scope. The SAR provides discussion on the scope of the project, and the resulting standard is within that scope. For example, while the discussion in the SAR related to supplying data and models provides an extensive list of functions and an associated table (Table 2), it indicates that such functions should be provided data "as applicable."

Consolidation, Simplification, and Supplemental Information

Many commenters provided support for the consolidation and simplification approach in MOD B, while other commenters requested some level of separation of the short circuit items from the MOD B standards. Commenters also agreed that the approach in MOD-032-1 generally aligns with current practices. The SDT appreciates the support for simplifying and consolidating the existing standards into a more useful set of Reliability Standards, and it also notes that the standards in many respects do not prescribe how an entity must organize or otherwise conduct its operations to meet the standards.

In addition to the consolidation and simplification, commenters thanked the SDT for providing the supplemental information alongside the formal posting of the MOD B standards. In particular commenters appreciated the coordination with NERC compliance operations, and they found the additional background information helpful. The SDT appreciates this input, and wants to continue to highlight that information going forward, particularly the consideration of issues and directives, as many approaches reflected in the standards are informed by the discussion regarding remaining directives. The SDT has also attempted to explain the directives in the rationale boxes in the standards.

A commenter suggested to combine the MOD standards with the TPL standards as part of a standards restructuring recommended by the Independent Experts Review Project report, but the SDT notes that such a combination is not in scope of what the SDT is addressing in this project, and such a transition of the standards family would be part of a larger shift outside the shift of this project. The new construct approach must be developed separately to ensure all issues related to such a restructuring are coordinated with the industry.

A comment asked for clarification on whether Transmission Owners (TOs) would still be responsible for submitting the steady state and dynamic data for Generator Owners (GOs) since MOD-032 R3 states that "Each BA, GO, LSE, RP, TO, and TSP shall provide steady-state, dynamics, and short circuit modeling data to its TP) and PC according to the data requirements". The SDT response was that each data owner is responsible for the data for their equipment, but nothing in this standard, similar to other Reliability Standards, precludes agreements to provide on behalf of another entity. Such arrangements do not diminish the underlying data owners' responsibility, nor does it make the entity submitting on behalf of another subject to the underlying data owners' compliance obligations in this respect.

A comment stated that GO requirements in MOD-010, 11, 12 and 13 were well-defined and reasonable in scope. The SDT response is that the mentioned standards are not all approved and may not be consistent with outstanding directives. See also the discussions on “RRO” applicability later in this report.

Some commenters suggested changes to the structure of MOD-032-1, such as combining Attachment 1 into one column instead of 3 columns for steady-state, dynamics, and short circuit. This was not supported by the majority of entities and the SDT thought the current three columns provided more clarity. Another commenter wanted to remove all requirements in MOD-032-1 except R3 and insert a reference to Attachment 1 in R3. This suggestion was not supported by the majority of commenters or the SDT, as the standard outlines several other obligations among and between entities, and the other requirements added clarity. Requirement R2 was removed, however, and that is discussed later in this report.

Applicability

A commenter asked that “Planning Coordinator” be replaced with “Planning Authority”. The SDT notes that these are the same intended functions, and it has modified the applicability section to indicate that it applies to the “Planning Authority and Planning Coordinator.” The proposed standards combine “Planning Authority” with “Planning Coordinator” in the list of applicable functional entities. The NERC Functional Model lists “Planning Coordinator” while the registration criteria list “Planning Authority,” and they are not yet synchronized. Until that occurs, the proposed standard applies to “Planning Authority and Planning Coordinator.”

A commenter also suggested that the functions be made singular to align with other standards. The SDT has made that change, but notes there is some inconsistency among the body of NERC Reliability Standards, even though it has no substantive effect on application of the standards.

Coordination with Other Standards

Several comments expressed concern there is duplication of requirements regarding MOD-032-1 with TOP-003-2 and IRO-010-1. The SDT compared the standards and has determined that the standards do not duplicate work nor compliance responsibilities. MOD-032-1 is focused on longer term planning analysis, i.e., one year, five year and beyond. Also, MOD-032-1 is applicable to the Planning Coordinators (PCs) and Resource Planners (RPs). Both functional entities are not included in the TOP or IRO standard.

With respect to TOP-003-2, the Purpose reflects real time analysis and monitoring. Therefore, the data to be provided to the Transmission Operator (TOP) by the applicable entities will not be the same as in MOD-032-1, nor will the frequency of receipt of data be the same. Specific to TOP-003-2, R1 states the data to be provided is for Operational Planning Analysis. This term, as defined in the NERC Glossary of Terms, is as follows:

An analysis of the expected system conditions for the next day’s operation. (That analysis may be performed either a day ahead or as much as 12 months ahead.) Expected system conditions include things such as load forecast(s), generation output levels, and known system constraints (transmission facility outages, generator outages, equipment limitations, etc.).

By this definition, which requires data to support real time operations and planning, the SDT does not believe there is duplication with MOD-032 and its applicable data requirements.

For IRO-010-1a, the SDT concluded that there is no duplication of work or compliance responsibilities consistent with the same explanation for TOP-003-2. The data to be provided in the IRO standards supports real time analysis and Operational Planning Analysis.

There were also comments regarding duplication of MOD-033-1, R2 with the TOP and IRO standards. The SDT reviewed the standards and did not identify duplication. MOD-033-1, Requirement R2 does include possible submittal of Real-time data but it is in response to a PC's request for this data as well as other types of data.

Other commenters questioned whether MOD-032-1 has similar requirements to FAC-008, TOP-002, and VAR-002. VAR-002's similarity is in Requirement R4, where it requires the Generator Owner to submit a subset of MOD-032-1, Attachment 1 data for generator step-up transformers for the Real-Time Operations Horizon (1 hour or less). TOP-002's similarity is in Requirement R19, which requires the Balancing Authority (BA) and TO to maintain accurate computer models for analyzing and planning system operations for Operations Planning. The VAR-002 and TOP-002 standards are for the Real-time Operations and Operations Planning time horizons. The MOD-032-1 and -033-1 standards are effective for the Long-term Planning horizon, which is after the time horizons for the TOP and VAR standards. The FAC-008 standard is applicable to the Long-term planning horizon as well and covers the documentation for determination of facility ratings by the GO and TO and a provision of those ratings to the same entities as required by MOD-032-1 (PC and TP). FAC-008 also includes the RC, TO, and TOP. Submission of facility rating data for MOD-032-1 to the PC and TP could also satisfy the FAC-008 requirement to send facility rating data to PC and TP, but they serve different purposes. Short term de-ratings, MW, and MVar limitations should not be submitted for MOD-032-1 unless those de-ratings and limitations extend to the Long-term horizon.

MOD-032-1

Short Circuit Data

A few commenters questioned if steady-state, dynamics, and short circuit data should be in a separate standard and if short circuit data should even be part of any NERC standard data request. The SDT considered the comments from stakeholders, and while a few would like to separate them, the majority preference is to combine them as it creates fewer requirements. Regarding the need to include short circuit data, the directive from FERC Order No. 890, paragraph 290, specifically requires inclusion of short circuit data. Having the short circuit data as part of this standard supports that information being shareable on an interconnection basis, particularly to support analysis at the seams, and it supports TPL-001-4, Requirement R2, which requires the Transmission Planner (TP) and PC to include a short circuit analysis as part of its annual assessment.

A commenter suggested that the results of analyzing this data are already available in two places - as part of the annual FERC Form 715 filing, which provides a summary of all Transmission Planning activity for the prior calendar year, as well as in the annual Grid Assessment Study Report. In response, the data itself may not be available or available in a form that can be used from those sources.

In addition to the directive to include short circuit data, the SDT also offers the following observations. System protection is often perceived to be the sole use for short circuit data. However, short circuit data is also used in conjunction with power flow and dynamics applications, for example, to adaptively calculate unbalanced fault shunt admittance for prior outages and sequential clearing in dynamic simulations, particularly where regional stability is or could be impacted.

Regional Reliability Organizations (RRO) Applicability

Many commenters expressed concern over Regional Reliability Organizations (RROs) not controlling the data collection procedure as in the current MOD-010 through MOD-015 standards. Notably, four of those six standards were not approved by the commission as "fill-in-the-blank" standards in part because of the RRO applicability. The SDT notes that the standard does not preclude a Regional Entity's (RE) involvement in the data collection, however, the designation RRO is not in the NERC functional model, and NERC Reliability Standards' applicability is based on those functions. Therefore, NERC cannot require the "RRO" to develop data requirements and reporting procedures. The structure of the requirements in MOD-032-1, culminating in the

requirement to make available data to the ERO or its designee for each Interconnection, is created specifically to support Interconnection processes, however. The standards create a framework for the continuation of the processes that have worked in each Interconnection.

Registration Concerns

A few commenters raised registration concerns. One commenter did not know who its PC was, while some PCs did not know who their data owners were. The SDT agrees with commenters that for this standard to work effectively, the PC will need to know all registered entities (TOs, GOs, TPs, Distribution Providers (DPs), Load Serving Entities (LSEs), Transmission Service Providers (TSPs), and RPs) within its purview, and vice versa (entities need to know who their PC is). The SDT notes these comments and guidance at the end of the standard addresses some of these issues. The SDT believes continued regional clarification and outreach is also necessary, and the SDT will pass this on to NERC and Regions. The guidance also provides explanations for data owners to begin working with their Transmission Planners to identify their Planning Coordinator. One commenter also stated it would be helpful if NERC or the Regional Entity would provide such a mapping (listing of registered entities (TO, GO, TP, DP, LSE, TSP, RP) within their purview) to the PCs on an ongoing basis so that PCs and data submitting entities can stay current on their obligations. The SDT will pass this onto NERC also.

Facilities

A commenter suggested the drafting team should provide guidance on how the PC should handle Generating Units with capacity limits below the NERC functional entity registration limits. The commenter indicated that generators below the 20 MVA single unit and 75 MVA plant are still desired to be modeled both in the Interconnection-wide case and PC-level models. A different commenter expressed the opposite concern. In response, the SDT notes that standards apply to functional entities and NERC's jurisdiction relates to the Bulk Power System. While such data is not precluded to be modeled, it is outside the scope of the reliability standard itself. Such data is typically provided through other existing procedures or arrangements. Furthermore, in Attachment 1, the SDT has also clarified the specific Demand data required by Attachment 1 is the Demand aggregated under each bus identified by the TO.

Requirement R1

Many commenters raised concern with the PC-developed data collection procedures. Specific concerns were data collection consistency and whether a PC could require data that is not needed for reliability. Commenters are concerned PCs will ask for items not needed and PCs will have inconsistent procedures. The SDT discussed this issue in length and added clarification to Requirement R1 that PCs must create their data requirements and reporting procedures jointly with TPs, and the requirement is more specifically linked to support Interconnection-wide modeling to address inconsistency concerns. In addition, the SDT notes that the data in attachment 1 is separate from the other criteria and no longer "at a minimum."

A few commenters questioned Requirement R1, parts 1.1 through 1.6, asking why this criteria was included in the requirement and not in an attachment. The SDT notes that attachment 1 is part of Requirement 1, and that it specifies the data that must be provided. The rest of the criteria inform details that must be included in the data requirements and reporting procedures relative to that data.

A few commenters stated that GO requirements in MOD-010, 11, 12 and 13 are presently well-defined and reasonable in scope. MOD-032-1 proposes to leave the type of model, level of detail, size cutoffs (if any), case types and scenarios to be established as part of the data requirements and reporting procedures.

One commenter raised questions about Requirement R1, Part 1.4, concerning the level of detail and model requirements, including system topology, handling of conductor changes along a transmission line, etc., and that it may be different for each model type, such as the details of a steady-state model may differ compared to a

short circuit model. The SDT confirms this understanding and notes that this is why the requirement is written this way; it is expected that the level of detail may vary with model type.

A Commenter asks that data format established by a PC be publically available and not unique to any particular vendor software application. The SDT notes that the standard does not require publicly available software, but it also does not require or prohibit a particular vendor software application. The PC and TP jointly create the data requirements, which may mean specification of a particular software application.

A commenter also asked whether NERC is planning to work with vendors on data interchange among software platforms, and the SDT notes NERC coordination of this type is outside the scope of the drafting team. However, the SDT is encouraged by focus from NERC, various modeling working groups, and the Planning Committee in various areas related to modeling.

Some text changes were suggested such as insertion of the following parenthetical at the end of MOD-032-1 R1.5 “Specification of the case types or scenarios to be modeled (for steady state and dynamic data sets)” to limit the case types or scenarios to steady state and dynamic. Since some entities also create short circuit case types, this language was not added.

A commenter suggested that use of the term “case type” is confusing, as these are already specified as steady state, short circuit, and dynamics. Part 1.5 also states that the scenarios to be modeled should be included. The commenter suggests there is no need to specify those scenarios as part of data collection. The SDT disagrees and has retained that language, because “case type” and “scenarios” terminology is clear once attributes are assigned to the model sets by respective PCs (e.g. years, seasons, forecasts, transactions, peak, off-peak, etc.). There were comments on the provision to provide the data at least once every 13 calendar months, and whether it should be modified or have language added concerning alternative schedules. The SDT notes that “at least 13 calendar months” is meant to indicate a timeframe that is generally repeated at the same time each year, but considers that an exact 365 day timeframe between submissions may not be practical for a number of reasons, including holidays, weekends, or even operating emergencies. For example, if an activity is conducted on July 1 of each year, but on year 2, July 1 is a Saturday, conducting such activity on July 3, the first Monday, would still be within 13 calendar months of the previous iteration of that activity.

Requirement R2

Requirement R2 from the last posting has been eliminated. Instead, Requirement R1 now includes a new part requiring the PC and TPs to include specifications for distribution of the data requirements and reporting procedures. For purposes of this report, references to Requirements R1 through R5 of MOD-032-1 relate to the previously posted version (i.e., because of the removal of Requirement R2 since the last posting, Requirements R3 through R5 were renumbered, and subsequent discussion in this report of Requirement R3, R4, and R5 are in context to the previously-posted version, and they map to newly renumbered Requirements R2, R3, and R4, respectively, in the currently-posted draft MOD-032-1).

A few commenters suggested distribution to data owners upon any modification instead of providing to data owners upon request. Others raised the concern that R2 is administrative and should be eliminated, and that the PC should simply deliver the data requirements and reporting procedures to the data owners once they have been developed. The SDT discussed that the requirement clarifies the responsibility and obligation of the PC to distribute the procedures upon request and is therefore not purely administrative.

Commenters suggested MOD-032-1 Requirement R2 falls under the Paragraph 81 criteria. The Paragraph 81 criteria addresses “requirements that obligate responsible entities to report to a Regional Entity, NERC, or another party or entity “on activities *which have no discernible impact on promoting the reliable operation of the BES* and if the entity failed to meet this requirement there would be little reliability impact.” (Emphasis added).

The SDT does not agree that Paragraph 81 is invoked since the submission of data for use in the planning models does constitute “promoting the reliable operation of the BES” and that there would be a “reliability impact” if data is not submitted for the planning models since planning the transmission system for future growth is necessary to ensure reliability.

In response to comments and questions on Requirement R2, however, the SDT discussed that the PC has an interest in ensuring that it receives data to support the PC’s obligations. Furthermore, the details of Requirement R2 could have resulted in unintended over-breadth. In response, the SDT has decided to include within R1 a part (Part 1.3) requiring specifications for distribution or posting of the data requirements and reporting procedures so that they are available to those responsible for providing data. In this manner, the SDT believes it addresses the general issue of availability while simultaneously leaving decisions regarding distribution or posting to the determination of the jointly developed data requirements and reporting procedures.

A commenter asked the SDT to consider modifying Requirement R2 to require the PC to be responsive similar in concept to what is required in FAC-010-2.1. Requirement R5 of FAC-010-2.1 states: “If a recipient of the SOL Methodology provides documented technical comments on the methodology, the Planning Authority shall provide a documented response to that recipient within 45 calendar days of receipt of those comments. The response shall indicate whether a change will be made to the SOL Methodology and, if no change will be made to that SOL Methodology, the reason why.” The SDT did not make this change. Requirement R2 was included to support an entity being able to acquire established requirements and procedures, and it was not intended to be a forum for making changes to those requirements and procedures.

Requirement R3

A couple comments questioned why the TP and PC are listed to receive data. The SDT notes that while the PC and TP are listed, it also states “according to the data requirements and reporting procedures developed by its Planning Coordinator in Requirement R1,” so this could be further specified in the procedure defined in Requirement R1.

One commenter suggested the sentence, “For data that has not changed since the last submission, a written confirmation that the data has not changed is sufficient” is not needed since it is not a requirement. The commenter suggests it is a measure of compliance already adequately captured in the Measure. In response, the SDT notes that it provides additional emphasis and clarity to the requirement that the full submission of data is not required if it has not changed. This was also a key consensus point.

Requirement R4

Several commenters raised concerns regarding the Requirement R4 feedback loop. Some questioned if it was necessary while others thought it did not go far enough. Additionally, a comment asked whether the PC or TP will be required to use erroneous data if they cannot continue the feedback loop to their satisfaction. Also, several commented that 30 days is too short to provide the feedback.

The SDT discussed these comments and Requirement R4 at length, which included discussion regarding whether to remove the requirement. The discussion to remove it was in light of changes to Requirement R1, especially since changes to Requirement R1 focus on the PC jointly developing reporting procedures with the TP, and reporting procedures could reasonably be expected to cover issues of submission acceptability, usability, etc. After much discussion, however, the SDT decided to keep requirement R4 and made modifications in response to comments. The SDT made the following modifications:

1. Requirement R4, Part 4.2 (related to user-defined models) was removed, though the concept was added to attachment 1 under the dynamics data heading (also see the more extensive discussion on confidentiality concerns, below, as this is related);

2. old Part 4.3 (now Part 3.2) was changed from 30 days to 90 days; and
3. Requirement R5 (now Requirement R4) was modified to state that the PC submits models “reflecting” the data it receives to support creation of Interconnection-wide cases to address the concern about whether the PC is obligated to use data it knows may be inaccurate (i.e., the PC can modify the data upon submission to reflect a more accurate representation if necessary).

One commenter raised concern that M4 was too prescriptive. After review and discussion, the SDT disagrees, as M4 provides numerous ways to meet Requirement R4.

Requirement R5

Commenters expressed concerns about the Interconnection-wide case building process and Requirement R5. Some Commenters suggested using section 1600 data request to collect data for interconnection model building. Regarding section 1600, the SDT points out that this standard is about specifying the relationship of obligations between and among different functional entities, not about providing data to the ERO.

Many Commenters expressed concerns that even though the PC can create Planning Horizon models for its region, they cannot build a ‘standalone’ model to perform studies without the coordinated efforts of external entities within the planning horizon (i.e. Interconnection models). Similarly, some comments asked who is responsible for building the Interconnection-wide cases under the standard. The SDT points out that while the standard does not prescribe how the Interconnection-wide case is built, the standard is limited to directing the PC to provide the information to the entity that does create the model (the standard is not a standard to create the Interconnection-wide case, it is a standard outlining obligations among other functions to support collection of data for use in the Interconnection-wide case). The ERO has an interest in ensuring the interconnection-wide cases are built, and that interest exists without the need for a standard directing their compilation. This is also why both Requirement R1s from MOD-014 and MOD-015 are not being mapped to the new proposed standard.

Similarly, a commenter suggested that the drafting team should consider developing a separate standard for each Interconnection (referencing IRO-006 as an example) in recognition of the current modeling practices employed in each Interconnection. The SDT agrees that the standard should account for different practices among Interconnections. Similar to the explanation above, one of key reasons for structuring MOD-032-1 in the way it is structured is to provide a framework that supports and recognizes the differences among Interconnections in modeling practices, and a separate standard for each Interconnection is not necessary to support that framework.

Another comment concerned making sure that the “fill in the blank” aspects of MOD-011, MOD-013, MOD-014, and MOD-015 are not repeated. In MOD-032-1, this was fixed by requiring the PC to make available the models reflecting its planning area to the “ERO or its designee. The reliability-related task that Requirement R5 addresses is the obligation of the PC to make available their data in support of the Interconnection-wide case. The SDT also notes that the standard does not preclude RE involvement (and, as discussed earlier, the term RRO is not in the NERC functional model).

Commenters also raised concern that PCs need to collaborate to build Interconnection-wide cases. The SDT agrees and notes that the framework does not prohibit such collaboration.

Several commenters raised concern that Requirement R5 required each PC to submit data to the ERO or its designee to support creation of the Interconnection-wide cases, and that the PCs have no obligation to collect data on the same schedule and no obligation to build the same set of models. The SDT clarified that Requirement R1 procedures support Interconnection-wide case building, and the PC obligation under Requirement R5 (now Requirement R4) would inform development of the data requirements and reporting procedures.

A few commenters raised concerns regarding Requirement R5.2 related to data modification. Specifically, the concern was whether the act of a PC modifying data would cause a noncompliance for making unreported modifications to support the Interconnection-wide case, or whether all modifications of any type would need documentation. The SDT agrees and has removed R5.2 and clarified that the PC is submitting models for its area that reflect the data it receives from its data owners.

MOD-032-1, Attachment 1

Attachment 1 – Specific Change Requests

Many commenters submitted concerns over the level of detail in Attachment 1. Some of the more frequently noted concerns shared by a large number of commenters were:

- it was too prescriptive;
- it required information that was not needed for reliability;
- it was too onerous for a “at-a-minimum” requirement; and
- it allowed for the PC or TP to potentially impose additional reporting requirements

The SDT agrees with the comment that Attachment 1 was too prescriptive. In response, many of the details and the prescriptive nature of the data items have been removed from Attachment 1. The number of data items requested has also been limited to those needed for reliability purposes. Additionally, language that was vague has been improved. It is intended that individual PCs and TPs will address the appropriate amount of additional detail necessary through their individual procedures and data submission requirements as agreed upon through a stakeholder process. The applicability of functional entities was reviewed. The standard does not preclude entities collaborating to ensure appropriate data submission – for example LSEs can work with the TOs to ensure that the demand information submitted is appropriate. The SDT directs commenters to the revised Attachment 1 included in the draft MOD-032-1 standard.

In response to some of the specific comments, the SDT provides the following additional clarification:

- Auxiliary load being netted with generation can be problematic, since the auxiliary load is necessary during dynamic studies to model plant outputs at their maximum value. Additionally, Attachment 1 has been updated to clarify that auxiliary load data shall be provided for normal plant configuration.
- Regarding concerns for item # 9 (under steady-state data), the SDT recognizes the need for the PC/TP procedures to have flexibility in configuring its procedures to potentially account for modeling data for newer generation and transmission technologies. The PC/TP procedures shall include the level of detail that should be provided to support the interconnection-wide models. These procedures are expected to be developed through individual PC/TP processes after thorough vetting of specifications and stakeholder consensus. Given the other requirements in the standard (Requirement R5, now Requirement R4) it is expected that all the PC/TP procedures would conform to how the ERO (or its designee) drafts their procedures – thereby lending consistency across the various PC/TPs.
- Regarding the concern of providing data for MOD-026-1 and MOD-027-1, and perhaps double compliance jeopardy, the SDT notes that although there may be some overlap in that data, the purposes of the standards are different. MOD-032-1 is a data submission standard; other standards referenced are largely data verification standards.

Short circuit Data

Various comments were received pertaining to the inclusion of short circuit data in the MOD-032-1 standard. A summary of those comments and corresponding responses by the SDT are included below.

- Standards pertaining to development of Interconnection-wide cases such as MOD-032-1 should not include short circuit data.

- The SDT agrees that developing interconnection-wide short circuit models may have limited value – and notes that that is not the intent here. The new TPL-001-4 standard (pending approval) does require that short circuit analyses be performed by the PC and TP. Short circuit data is being collected with the intent of better coordination of this data and short circuit analysis along the PC/TP seams. Additionally, the FERC directives also require inclusion of short circuit data in the standards.
- If short circuit data collection is included, its submission should only be required, at a maximum, once every 13 calendar months.
 - The SDT agrees with the 13-month data submission requirement.
- Additional detail requested in Attachment 1 indicating how the data submission requirement may be met (for example, adding language noting that positive sequence data may be substituted for negative sequence data where appropriate).
 - The SDT agrees with the intent of the comment. The PC/TP procedures should provide this level of guidance on what constitutes appropriate data substitution. The standard as written does not preclude submission of such data.
- Concern regarding potentially insufficient coordination between functional entities
 - The standard does not preclude coordination among functional entities as needed. The SDT notes that this coordination, including specifics on how the individual transmission elements will be modeled, could be part of the PC/TP process and should be adequately covered by the individual PC/TP procedures.
- Concerns for vagueness of the “Short circuit” column in Attachment 1 were expressed.
 - The SDT modified the requirements in the column by removing the details and leaving the specifics of the details for inclusion into the PC/TP procedures with stakeholder input and concurrence.

For a review of the changes made, the SDT directs the commenters to the revised Attachment 1 of the MOD-032-1 standard.

Dynamics Models

Comments were received pertaining to the requirement for submitting dynamics data as part of the MOD-032-1 standard. A summary of those comments and corresponding responses by the SDT are included below.

- In general, the standard should allow submitting estimated or typical/generic dynamic data. For newer generating facilities the standard should require submission of only unit-specific data.
 - The SDT would like to note that the standard as written does allow submission of estimated/typical data – and at the same time does not preclude submission of unit-specific data. More detailed stipulations can be included in the specific PC/TP procedures as necessary.
- Concerns with violating confidentiality agreements due to use of proprietary models; commenter recommendation that the standard should prohibit use of proprietary/user-defined (“black-box”) models
 - The SDT recognizes the occasional need to rely on “black-box” models (say for newer technologies that have not yet been more universally included in commercial software program model libraries). The SDT therefore notes that use of “black-box” models shall be permitted by the standard. The revised standard, while not prohibiting their use, clarifies information required for “black-box”/user-written models in Attachment 1. Additionally, to address the confidentiality concerns, the SDT also notes that the use of proprietary models is not a requirement. To assess the reliability of the transmission system, use of generic or library models is acceptable. Should there be a need to use proprietary (“black box”) models, those will

need to be supplemented with proper documentation, as noted in the revised Attachment 1. See also the more extensive discussion on confidentiality concerns, below.

PC/TP Data Requirements and Reporting Procedures

Comments received pertaining to the proposed PC/TP procedures and the SDT responses are noted below:

- Planning Coordinators should:
 - (1) identify those items in their data specifications that correspond to Attachment 1; and
 - (2) provide the latest data they have on hand when the data template is issued.
- The SDT did consider the comments. There were not any other comments in support of these changes. (1) The SDT notes that the PC/TP, through their individual stakeholder process, should draft the data submission procedures such that data items in Attachment 1 are identified with sufficient clarity. (2) The latest data that the PCs have should generally be available in the models developed by the PC/TP, which should be accessible to data owners pursuant to appropriate non-disclosure agreements.
- Concern regarding impacts to data owners related to the discretion afforded to PC/TPs in drafting their procedures
 - As discussed earlier, the SDT believes the procedures developed should be jointly developed. As such, the language in R1 now reads that the procedures shall be jointly developed between the PC and each of its TPs. Additionally, the “at-a-minimum” language has been removed from Attachment 1, so that the PC/TP procedures will be vetted through stakeholders, and specifications will be put into the procedures after stakeholder consensus.

Miscellaneous

Various comments of a general nature requesting specific changes to Attachment 1 of the MOD-032-1 standard were received. Those comments and the SDT responses are noted below:

- MOD-032-1 draft standard does not seem to include Attachment 1
 - The SDT notes that Attachment 1 is located at the end of the proposed MOD-032-1 standard following the “Table of Compliance Elements”
- Comment requesting addition of item 9 under “steady state” to dynamics and short circuit columns as well
 - The SDT agrees with the comments and has modified Attachment 1 accordingly.
- Comment requesting clarification on Attachment 1 functional obligations and recourses available if data is not available
 - In response to concerns about functional obligations, the functional obligations of Attachment 1 are clearly delineated and the function expected to provide each type of data is listed parenthetically following each data type (and that is further explained in the supporting footnote to the attachment).
 - Additionally, if the data is not available, the PC/TP procedures could include language where the data owner will need to assist the PC/TP in getting the best value through testing or estimating, and if its older equipment, it is likely already represented in the model.

Black Box Models and Confidentiality Concerns

Many commenters discussed confidentiality or non-disclosure agreements relative to user-written models. The concern is well-taken by the SDT, and the comments were very helpful.

Several commenters expressed concerns over black box models and confidentiality concerns. A few thought they should be prohibited by the standard. Others thought it would cause a data owner to either violate a confidentiality agreement or not comply with standard. The SDT made changes to Requirement R4 and attachment 1 to clarify and address this concern. The SDT also would like to clarify that the standard neither prohibits nor requires a black box or user-defined model be submitted. The standard allows use of a generic or library model as long as it provides an accurate representation of equipment.

Additionally a commenter suggested adding “where confidentiality agreements allow” to the shareability criteria. Again, the SDT notes there is no requirement to submit proprietary or confidential information, and if agreements do not allow sharing the proprietary model, the expectation is for the data owner to submit a generic or library case that is shareable.

The standard *does not require use of proprietary or user-written models*, and the changes clarify that notion even further by linking the additional information relative to user-written models to those cases where such models are provided *in place of a generic or library model*. The qualification on user-written models applies only when they are provided by the data owner; it does not require their use. Therefore, if a confidentiality or non-disclosure agreement applied to a specific user-written model prohibiting the release of that additional information, the standard would not require its use in contravention to that agreement. But the data submitted by the data owner needs to be shareable, and representation by a generic or library model would meet that criterion. The standards help support the Interconnection-wide case building process, and when model structures with proprietary or confidential information are submitted without additional information, it impedes the free flow of information necessary for Interconnection-wide power system analysis and model validation.

To facilitate the use of generic models, and to address concerns in building the interconnection-wide cases related to user-written models, the SDT would like to highlight that the NERC Planning Committee has also been discussing this issue. At the September 18, 2013, Planning Committee meeting in Denver, CO, the Planning Committee reviewed and approved, in concept, the Modeling Working Group (MWG) *Proposal for Use of Standardized Component Models in Powerflow and Dynamics Cases*. In conjunction with the standards development of MOD-032-1, this development by the MWG supports efforts so that standardized models will be capable of representing all operating or planned equipment attached to the power system with reasonable accuracy.

The following are key excerpts from that paper (The full report is available as part of the NERC Planning Committee’s September 17-18, 2013 agenda package [beginning page 15 of that .pdf document] here: <http://www.nerc.com/comm/PC/Agenda%20Highlights%20and%20Minutes%202013/Draft%20PC%20Meeting%20Agenda%20September%2017-18,%202013%20--%20Denver%20Colorado.pdf>):

Means for Developing Standardized Models

The industry should achieve a consensus on a set of standardized models for both powerflow and dynamics. Simulation software user’s group meetings, which are program-specific, have not been effective and are not suitable for this purpose. MWG supports industry activities to develop, validate, and maintain a library of standardized component models with a standardized set of parameters for both powerflow and dynamics. Participation from manufacturers, software vendors, and stakeholders is necessary to accomplish this goal. Modeling focus groups in each region or interconnection need to be represented in the MWG.

The MWG is an industry-wide forum for developing agreement on new component models and their characteristics for representation of new technologies. The group also reviews existing standardized models for operating and planned equipment to meet the evolving needs of the industry.

The MWG incorporates modeling developments from each of the regions and interconnections. Existing regional model development and validation working groups will continue their present work. Some regions already have a set of standardized component models for use in their interconnection-wide models. Any model in a regional standardized model set should be included as part of the library of standardized models created by the MWG. Consolidation of similar user-defined models should be undertaken prior to standardization. Regions may use a subset of the industry approved standardized models. Although some models may have the same name amongst different regions, interconnections, and software programs, there exists a difference in functional details. The MWG will augment these regional efforts and strive, where possible, to consolidate the overlapping models.

Proprietary and User-Defined Models

The goal of the MWG is to have standardized, validated powerflow and dynamics component models for all equipment that can be freely shared and used for interconnection-wide studies. It is imperative that such models exist and be used to accurately analyze the interaction of devices and control systems across the interconnection to ensure reliable performance of the system.

However, when a new or novel piece of equipment is proposed for connection to the system, there may not be a standardized component model available that can accurately predict the equipment performance. Currently, some manufacturers are only providing the connecting Transmission Owner proprietary models whose details are contractually restricted from sharing, resulting in interconnection-wide models with “black box” models for some components. While such proprietary component models may be adequate for local analysis, they are not acceptable for interconnection-wide studies because they do not provide the information to engineers to accurately analyze the interaction of devices and control system across the interconnection. As such, the performance of the interconnection cannot be accurately predicted or ensured.

It is incumbent on the equipment owner to provide accurate, shareable models from the manufacturer that includes the necessary information for accurate interconnection-wide powerflow and dynamics analysis. Black box models or user-defined models without complete details that are currently in use should be replaced no later than the end of 2014 with standardized models or user-defined models that include all of the essential information. Connection agreements for new equipment should require standardized component models or shareable user-defined models that include complete details. For new equipment, exceptions to such a requirement should be mitigated by replacement of the interim models with standardized component models or shareable user-defined models that include complete details no later than six months after installation of the equipment.

All user-defined models must be able to be freely shared across the interconnection and include all of the information essential for accurate powerflow and dynamics analysis. For powerflow analysis, a user-defined model must specify all of the equations describing its characteristics and logic along with any other descriptive information. For dynamics analysis, a user-defined model must specify, at a minimum, a block diagram, equations describing the characteristics of the model, values and names for all model parameters, and a list of all state variables.

User-defined models should be placed on a swift path to inclusion in the library of standardized models. However, these models must be thoroughly reviewed, vetted, and validated by the industry as a whole before they can become standardized models. Once a corresponding standardized model is developed and validated, the regions should shift to the standardized model. The NERC MWG should serve as the central venue for those activities for North America.

MOD-033-1

Comments about MOD-033-1 asked several questions, such as what would constitute acceptable validation, how will the auditor interpret an entity's validation, and what does validation actually mean. The SDT wants to make sure that MOD-033-1 is focused on validation of "planning models." The planning model should be modified to be as consistent as possible with a real-time snap shot of topology, load, and generation pattern. While this is a difficult task, and various levels of consistency can be achieved with a reasonable amount of work, the SDT wishes to clarify that a comparison of performance is what is intended. The PC will determine a set of guidelines to determine the acceptable level of differences and methods to resolve those differences. The SDT made changes to MOD-033-1 to further clarify that the focus is on planning models in the purpose of the standard and in Requirement R1 by specifying it is the "planning" models.

Several comments questioned the validation timelines in MOD-033-1, stressing that 24 months was too frequent an interval to simulate a "local dynamic event". Some commenters indicated that the set-up of the simulation itself and completion of the simulation could take up to 18 months and the timelines in MOD-033-1 would result in a continuous amount of additional work necessitating additional staff. The SDT kept the 24 month requirement but removed the requirement to complete the simulation within 12 months of an event if an event had not occurred within the last 24 months. The SDT clarifies that the "local dynamic event" does not have to be a severe event requiring a large amount of set-up, but could be much smaller events that if done frequently over time would validate portions of the model in each 24 month period. The SDT also provided greater explanation of "dynamic local event" in the background section of the standard. In response to concern that validation every two years will be a large engineering effort, the SDT notes that the requirements are focused on planning area validation, and it leaves a lot of decisions regarding validation to the discretion of the PC.

Commenters asked for clarification of what constitutes a "dynamic local event." The SDT stated that the determination of "dynamic local event" is expected to be part of the validation process implemented by the PC. In the rationale for Requirement R1 in MOD-033-1, the "simulation of significant system disturbances and comparing the simulation results with the actual event results" is specified, but the rationale further states that "the details of 'how'" is not specified and is "best left to guidance rather than standard requirements." The Application Guidelines further state that dynamics model validation is limited to the PC area and the emphasis is on local events or phenomena, not the entire Interconnection, and the SDT has added more explanation to the background of MOD-033-1 about a dynamic local event.

Commenters expressed concerns regarding the expectations for accuracy in MOD-033-1. The SDT modified Requirement R1 to state that the PC will implement a process to conduct the model validation that includes guidelines to determine unacceptable differences and guidelines to resolve those differences.

Many commenters were concerned about which models to use in the validation. They stated that the RC Operations model should be used instead of the Near-Term planning cases that represented conditions one to five years into the future. The SDT emphasized that the planning cases should be used because the very point of MOD-033-1 is to make sure the planning cases, modified to represent a real-time condition, exhibit the same or similar performance as the operations models.

Another issue concerned validation of the data itself when a PC questions the data submitted by an equipment owner in MOD-032-1. The PC could use MOD-032-1, Requirement R4 to identify concerns with data, and the 30 day requirement for equipment owners to respond to PC in that requirement was increased to 90 days, as discussed earlier. Specifications to have guidelines to address data concerns were added in MOD-033-1, Requirement R1.4 to be included as elements in the data validation process the PC implements.

One commenter asserted that there is no technical basis for the requirements in the validation standard. The SDT has provided significant guidelines and technical basis following the requirements, and it has modified them

to be more descriptive in certain cases. In addition, the rationale sections of the requirements explain the remaining directives from FERC Order No. 693 (which itself provides significant technical discussion) and additional technical reasoning.

A commenter expressed that the idea that Planning Models can be adjusted to exactly match recorded system response is false. If one is successful in identifying aspects of the Planning Model that led to divergence from observed BES response, it may be possible to improve the match. An exact match is beyond the realm of possibility. Compliance metrics for validation are therefore not suitable. The SDT agrees, and notes that “match” in the context of the validation standard is determined by the PC’s judgment, not that it has to be an exact match. The determination for how close the match should be is left to the judgment of the PC and should be included in the PC’s procedures for validation. Apparently replicating characteristic behavior for local events is the best that can be expected with current day technology within the scope of a PC. Interregional stability may need to be addressed at a higher level, but that is outside the scope of this standard.

One commenter stated that differences between recorded system response and dynamic model response are difficult to associate with a specific model due to the manner in which generators affect each other throughout the Interconnection. The SDT realizes that determining which model is causing a discrepancy between simulations and recorded disturbances can be challenging. However, the standard only requires comparisons for local events. Models throughout the Interconnection will not affect the local response. If the disturbance under consideration involves generators outside the local area, then it would not be an event that should be studied for the purposes of this standard.

Two commenters were concerned that Requirement R1.1 requires the use of a State Estimator. In response, the standard does not require that a state estimator be used. The requirement is to compare a planning power flow model with actual system behavior which could include real time data sources rather than a state estimator.

One commenter questioned if the Application Guidelines section of the Standard is “primary law” or is suggestive guidance. This section is guidance. Any mandatory items are contained in the requirements.

One commenter suggested that the drafting team consider other alternatives to approaching the FERC directive instead of developing a validation standard. The SDT believes that the standard that has been drafted is the best way to respond to the directives, and no alternative approaches with justification about how they satisfy the directives have been articulated through input or outreach.

A commenter raised concern regarding whether the measure and requirement were mislabeled. The SDT confirmed that the requirement and measures were labeled correctly.

One commenter questioned the rationale for 30 days in Requirement R2 as an appropriate timeline for providing data. The SDT believes that the data required by Requirement R2 is readily available and that 30 days is an appropriate time frame.

One commenter stated that Requirement R1 should include “each Planning Coordinator, in conjunction with each of its Transmission Planners, must . . .” The SDT did not make this change because it is appropriate for the requirement to be placed on the PC. If the PC wants to involve its TPs in developing the procedures, then the standard allows the flexibility to do so.

One commenter suggested that MOD-33-1 should be changed to include short circuit model validation. While it may be good utility practice to attempt to validate the short circuit model, the SDT does not believe this should be a requirement in the standard. This would be very burdensome to accomplish.

One commenter believes that MOD-33-1 should include a requirement to make corrections to data within 60 calendar days when unacceptable differences in performance are found. The SDT decided to leave this unspecified. It is up to the judgment of the PC when a correction is needed and when to make the correction.

One commenter suggested that in R1, “must” should be replaced with “shall” to be consistent with other standards. The SDT agrees and made the change.

A commenter asked that responsibility under Requirement R2 should be expanded to equipment owners to provide “actual system behavior data,” and the commenter proposed that R2 be worded to include them. In response, the type of data that the equipment owner may have, such as PMU or DFR data at a generator site, would generally be available at the RC or TOP, and the SDT did not add those functions to that requirement.

One commenter recommended that either MOD-032-1 or MOD-033-1 contains some language that requires each RC, TO, GO, LSE and TO to “self report” to the PC any changes in operational settings or other impactful actions within a certain period of such change. The SDT does not believe this is necessary because the data will be updated at least once every 13 months. If, in between updates, the comparisons between simulations and actual system data show a discrepancy, the PC will be contacting the data owner and any changes would be noted then.

One commenter suggested that the PC be required to perform a data check for all the data that it receives. Data checking should be done by the data owner prior to submitting the data to the PC. The PC is required to compare simulations using the data in the model to actual system measurements. The validation efforts required by MOD-033-1 is not the same as data checking.

One commenter recommended that the requirement to align state estimator and planning representations should be eliminated because of the potentially different topologies used by each (node-breaker in state estimator and bus-branch in planning cases). Another commenter was concerned that the state estimator case or other Real-time data may not contain enough level of detail required to validate the case. However, the standard does not require the two models to be aligned or to have the same level of detail. It just requires them to be compared. This can still be done even if the topologies are different. The comparisons should be made on major elements, not on every element in the case.

Some commenters suggested rewording of Requirement R1.1. The SDT has reworded Requirement R1.1 to require only the comparison of the power flow model to actual system behavior and has added a new R1.3 to indicate that the PC must establish guidelines for unacceptable comparisons.

One commenter asked for clarification on how an auditor will measure whether a PC has done enough validation to satisfy obligations in Requirement R1. The standard requires the PC to have a procedure and to make comparisons between planning models and actual system behavior data. The PC must have a procedure and follow it. The amount of validation done should not be relevant.

Some commenters offered rewording suggestions for R2, and the SDT made some changes to the requirement for clarity.

One commenter asked how the PC is going to validate data and questioned if there is an EMS case that is compatible with PSS/E. The standard requires a comparison of a planning power flow model to actual system behavior, represented by a state estimator case or other Real-time data sources. The state estimator case does not have to be compatible with PSS/E and it does not need to have the same level of detail. It just requires them to be compared. This can still be done even if the topologies are different. The comparisons should be made on major elements, not on every element in the case.

One commenter suggested that Transmission Operator should be added in the 6th line of M2. The SDT agrees and has added this.

One commenter suggested that the RRO or NERC, rather than each individual Planning Coordinator, should determine the how large the discrepancy between the system model and actual system performance can be. The SDT believes that this flexibility is needed for each PC because each PC's particular situation can be different (e.g. different voltage levels, different accuracy in real time data, etc.).

One commenter suggested re-wording for Part 1.2. The SDT agreed that the wording for 1.2 was not very clear and has re-worded it to say "Comparison of the performance of the Planning Coordinator's portion of the existing system in a planning dynamic model to actual system response at least once every 24 calendar months through simulation of a dynamic local event. If no dynamic local event occurs within the 24 calendar months, use the next dynamic local event."

One commenter stated that having an individual PC evaluate its own bubble would miss the impact that would be identified on large-scale system performance. However, the intent of the standard is to evaluate local models. When all PC's are doing this, then the large-scale performance benefits. Ultimately, evaluation of the large scale performance is the responsibility of the ERO, not individual PC's.

One commenter expressed a belief that there could be confidentiality concerns for an RC and TOP being directed to provide any PC actual system behavior data. The SDT does not see specific concerns with this data being provided to a PC.

One commenter stated that requirement R1.3 is redundant as it is already covered in requirements of the proposed MOD-032-1. The SDT does not see a redundancy issue, but has modified part 1.3 (now 1.4) to require the PC to have guidelines to resolve differences in performance between planning models and real time data, which might include provisions on whether and when to use the provisions of MOD-032-1.

One commenter stated that the reporting of data and modeling validation efforts is not presently part of the requirements in MOD-033-1. This is true, but the SDT does not see a need for the validation effort to be reported to anyone.

Implementation Plan

Commenters voiced concern over the implementation timelines and effective dates. MOD-033-1 is effective on the first day of the first calendar quarter that is 36 months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. This means that it is effective three years after approval, and the implementation plan further clarifies that the first 24 month period in the requirement starts on that date. Entities would need to have their plan complete by the effective date, but the obligation for completion of the periodic validation under Requirement R1 would essentially be five years after regulatory approval. For MOD-032-1, requirement R1 is effective approximately one year after approval, and the remaining requirements are effective approximately two years after approval.

VSLs

Commenters expressed concern that in the VSL section of MOD-032-1, the lower VSL seemed to state that perfect data submission (failed to submit 0% of required data) would result in a violation, which was defined as failure to submit 25% or less of the required data. The SDT clarifies that the VSL tables only determine the level of violation, not that a violation has occurred. Thus an entity that submits 100% of required data would not be

in violation and the VSL tables would not be consulted. Only if a violation has occurred (submission of less than 100% of required data) are the VSL tables consulted to determine violation level.

There was also a comment on the severe VSL for MOD-032-1, Requirement R2 indicating confusion with the “failed to provide . . . within 30 . . . or did provide in greater than 75. . .” The SDT agrees and has corrected the VSL to align with the graduated approach in the other VSLs for the requirement.

One commenter suggested that the second condition under the Lower VSL for MOD-033-1, Requirement R1 should be qualified so the situation only applies when the time between the previous dynamic local event and the events occurred that required a simulation within 12 months exceeded 24 calendar months. The VSL has been modified to match the other changes to the requirement discussed earlier in this report.

Additionally, since there were changes to most requirements since the last posting, the VSLs were updated to reflect those changes.